Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

CURRENT LITERATURE.

BOOK REVIEWS.

The abnormal formation of resin ducts.[1]

Dr. Alexander P. Anderson has distributed separates of his thesis presented to the faculty of the University of Munich for the degree of doctor of philosophy. The paper contains interesting matter for botanists, pharmacists, and foresters. A careful perusal of it however, leaves the impression that a large number of more or less interesting facts are here brought together, but without proper assimilation. This may be unavoidable because so little is known of the subject, too little to permit at this time any generalizations; for before the appearance of this paper little had been published upon the matter, the references to it being mostly incidental.

Resin ducts occur normally in the wood of spruces, pines, and larches, and are normally wanting in the wood of balsams, hemlocks, and cypresses. Wood parenchyma (simple resin receptacles, Göpp), according to Krause is present in the wood of all species of Abies. Hartig found a marked irregularity in the number and distribution of resin ducts in certain conifers that had been attacked by *Agaricus melleus*. He also found that in spruces in which so-called double rings were formed on account of late frosts, there is a striking irregularity in the formation of resin ducts in such rings. In 1892 J. Hortman made some comparative anatomical investigations on the shoots from a "witch broom" on *Abies pectinata* and the normal shoots of the same species, in which he found that in the abnormal formation of cortex there is great irregularity in the structure and in the size, as well as a considerable increase in the number of resin receptacles. E. Mer found an abnormal formation of resin ducts in shoots of Abies sp.? as a result of the attacks of *Phoma abietina*.

We must assume that abnormal resin receptacles are present only when the plant is in part or entirely pathologically influenced. If for example resin reservoirs be found in the wood of *Abies pectinata*, they are a sure indication of some pathological condition existing in the plant. Further, with our present knowledge we must assume that resin is strictly an excretion, being of no further use in the metabolism of the plant.

---

[1] ANDERSON, ALEXANDER P.—Über abnorme Bildung von Harzbehältern und andere auftretende anatomische Veränderungen im Holze erkrankter Coniferen. Inaug. Diss. Sonderabdruck aus der Forst.-naturw. Zeitsch., 1896. 8vo. pp. 38, *figs*. 7.

Three classes of pathogenic material were used in these investigations: (1) frosted conifers; (2) witch brooms on different species of Abies produced by the growth of *Æcidium elatinum*; and (3) tissues of conifers that had been infected with *Agaricus melleus*, *Phoma abietina*, or *Pestalozzia Hartigii*. In the first case tissues from *Pinus sylvestris*, *Picea excelsa*, and *Chamæcyparis Lawsoniana* were used. When twigs of *P. sylvestris* are frosted but not killed their tissues sometimes lose their power of becoming turgid and the shoots therefore tend to remain in a drooping position. By renewed growth near the tip of the branch the apex again assumes to a greater or less degree an upright position. Where this renewed growth takes place, on the under side of the branch a large amount of the tissue formed is similar to the "red wood" formed on the under side of normal hyponastic branches of *Pinus Strobus* and *Picea excelsa*. In both cases there are fewer resin ducts on the side of the twigs having "red wood" than on the other. "Double rings," or "frost rings," are sometimes formed in the two, three, or four-year-old parts of frosted pine shoots. In such cases there are generally no vertical resin ducts in the inner half of the annual ring. This is true also of *Picea excelsa*. The annual ring, with frost ring, in this species is essentially like that of *Pinus sylvestris* so far as structure, number, and distribution of ducts is concerned. In some instances, where the frost ring is formed late or where two are formed in one season, there may be developed a complete circle of resin ducts in the frost ring itself. Resin ducts are abnormally formed in the bast in twigs of *Chamæcyparis Lawsoniana* as a result of frosting in late spring. The ducts are formed where the cells have been forced apart by the formation of ice masses between them and they have failed to return to their normal position after the melting of the ice.

In the investigations on the "witch brooms" from species of Abies, particularly *A. pectinata* and *A. firma*, tissues of the tumor produced at the original point of infection of the leaf, of the twig and of the buds were employed. The branches of the "broom" on *A. firma* are negatively geotropic, have about twice the diameter of the normal branches and are relatively shorter. The diseased twigs develop very early as do the needles upon them, while the normal ones are much later. The latter are much thicker and about one-half the length of the normal leaves. In *A. firma* the diseased needles do not fall in the autumn, while in *A. pectinata* they do. In both the needles show no transverse heliotropism. The buds are relatively larger than those of normal branches; they have a greater number of scales but these are smaller than in the healthy bud. The resin ducts in the diseased bud scales have the regular form, but they are either abnormally large or abnormally small and have fewer and more irregular epithelial cells than have the normal scales. The mycelium of the fungus penetrates all parts of the tissue except the cavity of the ducts and the epithelial cells. Generally there are fewer stomata and trichomes and a smaller amount of fibro-vascular tissue than in the normal scale. In the rudimentary leaves and summit of the stem there are neither resin-ducts nor mycelium during the winter. Resin ducts develop earlier in the season in the cortex of the twigs of the "broom" than in normal twigs, and they are always present in greater numbers in the former than in the latter.

In the cortex of the "witch broom" tumor it occasionally happens that the communication by way of resin ducts between the diseased parts above the point of infection and the healthy parts below it is broken. Ducts are never formed in the phloem, while in the wood they are present in every annual ring. The diameter of these ducts and their number are greatest at the middle part of the tumor. From this point toward either end the diameter, number, and number of epithelial cells in each, diminishes. At the lower end all the ducts are pointed and terminate between diseased and normal wood. In the upper extremity all ducts which end with the tumor are pointed. Ducts seem to occur as often in the wood of healthy twigs having their origin above the point of infection as in that of the diseased ones. In the wood of the tumor there is usually, in each annual ring, a circle of ducts and sometimes two such circles.

Tissues of *Picea excelsa, Pinus Strobus,* and *Larix Japonica* infected with *Agaricus melleus* show that there is an increase in the number of vertical ducts in the diseased wood ring in all parts of the plant above the point of infection. The greatest increment of wood in the diseased ring is found in the upper part of the plant, from which downward the thickness of the ring decreases. With this decrease in thickness there is a corresponding increase in the number of resin ducts per square unit of section surface. In *Abies pectinata* infected with *Phoma abietina* resin ducts occur only in the healthy wood above the diseased part of the branch. These ducts are similar to those in the wood of the "witch broom" on Abies. Tissues of *Abies pectinata* and *Picea excelsa* infected with *Pestalozzia Hartigii* show in the former the formation of abnormal ducts only in the sound wood above the diseased part of the stem and in the latter the formation of a larger number of ducts in the healthy wood above the diseased part of the stem than is found in normal spruce wood.—L. S. CHENEY.

The sensibility of plants.

PHYSIOLOGISTS are engaged in the effort to bring the phenomena of sensibility of the plant and animal into a system with uniform terminology. One group of writers insist upon the elevation of the forms of sensibility of the plant to the dignity of senses, coordinate with those of the animal. A second group, basing their conclusions upon the reflex nature of the reactions of the plant, see nothing in them beyond highly specialized forms of irritability.